

NON-PUBLIC?: N
ACCESSION #: 9107050002
LICENSEE EVENT REPORT (LER)

FACILITY NAME: SEABROOK STATION PAGE: 1 OF 3

DOCKET NUMBER: 05000443

TITLE: Reactor Trip Due to an Inadvertent Actuation of the Turbine
Mechanical Overspeed Protection System
EVENT DATE: 06/02/91 LER #: 91-006-00 REPORT DATE: 07/02/91

OTHER FACILITIES INVOLVED: DOCKET NO: 05000

OPERATING MODE: 1 POWER LEVEL: 100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR
SECT
ON:
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
NAME: Allen L. Legendre, Lead Engineer - TELEPHONE: (603) 474-9521
Compliance, Extension 2373

COMPONENT FAILURE DESCRIPTION:
CAUSE: SYSTEM: COMPONENT: MANUFACTURER:
REPORTABLE NPRDS:

SUPPLEMENTAL REPORT EXPECTED:

ABSTRACT:

On June 2, 1991, at 6:47 a.m., a turbine generator trip with a subsequent reactor trip occurred while the plant was at 100% power. The trip was initiated by an inadvertent actuation of the turbine mechanical overspeed protection system. A Main Feedwater Isolation also occurred subsequent to the trip.

During a weekly turbine mechanical overspeed trip test, the oil trip solenoid valve (OTSV) did not return to its original position. Maintenance personnel removed one of the solenoid valve housing covers to conduct a visual verification of the actual position of the OTSV and its limit switch. While the housing cover was removed the limit switch assembly base plate and bracket dropped away from the housing. Consequently, the limit switch changed state causing the mechanical

lockout solenoid valve to reset. A turbine trip immediately resulted since the OTSV was still supplying bearing oil to actuate the mechanical overspeed trip lever assembly.

In response to the turbine trip and reactor trip, the condenser steam dump valves actuated as designed. However, two steam dump valves remained open longer than expected.

The cause of the oil trip solenoid valve to remain in the test position was the presence of corrosion products inside the valve body.

The oil trip solenoid valve was replaced and subsequently exercised to ensure free movement. Additional corrective actions include the following: 1) Similar solenoid oil valves will be labeled to warn technicians of the trip potential if the cover is removed; 2) The weekly mechanical overspeed trip test procedures were revised to provide additional guidance for unsuccessful tests and to exercise these valves on a weekly basis to prevent corrosion product buildup; 3). The oil resets, oil trip and mechanical trip solenoid valves in the Emergency Trip System will be replaced; 4) An evaluation of previous problems with the condenser steam dump valves was performed and no generic problems were identified.

END OF ABSTRACT

TEXT PAGE 2 OF 3

On June 2, 1991, at 6:47 a.m., EDT, a turbine generator trip with a subsequent reactor trip occurred while the plant was at 100% reactor power. The turbine trip was initiated by an inadvertent actuation of the turbine mechanical overspeed protection system.

Description of Event

During the performance of Procedure ON1431.18, "Weekly Mechanical Overspeed Trip Test", the oil trip solenoid valve (OTSV) and its associated limit switch did not return to their original position as required after being actuated. In this condition, bearing oil remained aligned to the shaft bushing keeping the mechanical trip lever in a tripped position and the mechanical lockout solenoid valve in the lockout position. After review and consultation between Operations personnel, the System Engineer and a General Electric (GE) representative, it was determined that, prior to proceeding any further, the actual position of the OTSV and its limit switch should be visually verified. This visual verification required removal of one of the covers on the solenoid valve housing. While the cover was being removed, the limit switch assembly

base plate and bracket dropped away from the housing. Consequently, the limit switch changed state causing the mechanical lockout solenoid valve to reset. A turbine trip immediately resulted since the OTSV was still supplying bearing oil to actuate the mechanical overspeed trip lever assembly. At no time did the main turbine generator overspeed.

Just prior to the removal of the housing cover, the oil solenoid limit switch was in the closed position, which prevents the continuation of the test. The oil trip solenoid valve's limit switch is actuated by the OTSV plunger. The limit switch is attached to the valve by the valve cover bolts. When the cover was removed, the limit switch dropped away from the housing and changed state.

Following the turbine trip and reactor trip, a Main Feedwater Isolation occurred. Pressure pulses were created by the rapid closure of the turbine control valves. These pressure pulses were transmitted through the steam flow transmitters' water filled lines and sensed by the high pressure side of the steam generator narrow range level transmitter. This resulted in the steam generator high-high level signal. Actual steam generator levels did not approach the high-high level setpoint at any time.

In response to the turbine trip and reactor trip, the condenser steam dump valves actuated as designed. However, steam dump valves MS-PV-3010 and MS-PV-3013 remained open longer than expected. The valve controller for MS-PV-3010 was subsequently recalibrated and its limit switch was readjusted. With respect to MS-PV-3013, extensive troubleshooting and investigation revealed no discernable cause. The valve was subsequently stroked dynamically approximately 30 times and no problems were identified.

Safety Consequences

There were no adverse safety consequences as a result of this event. All the applicable trips and interlocks associated with the reactor trip functioned as designed.

All operator actions were determined to be appropriate to ensure the safety of the plant. At no time during this event was there any impact on the health and safety of plant employees or the public.

TEXT PAGE 3 OF 3

Root Cause

The cause of the oil trip solenoid valve to remain in the test (open)

position was the presence of corrosion products inside the valve body. The source of the corrosion products came from the buildup of corrosion in the valve block due to a reduced frequency of valve cycling. The frequency for cycling the oil trip solenoid valve was reduced from a weekly test to testing during turbine startups. This reduction was made until a formal review and evaluation of maintenance and surveillance activities on the turbine generator, the turbine generator's Electrohydraulic Control (EHC) System, the Main Feed Pump Turbines and the turbine support systems was completed by the Technical Support organization. The evaluation was conducted after a turbine trip and reactor trip related to work on the EHC system occurred on August 22, 1990 as reported in LER 90-22. The evaluation concluded that weekly testing was appropriate in this particular case. The weekly testing resumed in April 1991. It is postulated that corrosion products built up in the valve internals during the period of extended testing frequency.

Corrective Action

After the trip, the plant was placed in HOT STANDBY in accordance with Procedure OS1000.11, "Post Trip to Hot Standby". An event evaluation and post trip review were immediately initiated. A Human Performance Enhancement System (HPES) analysis and a root cause analysis were also initiated.

The subject oil trip solenoid valve was replaced and subsequently exercised to ensure free movement. Additional corrective actions include the following:

- 1) Solenoid oil valves manufactured by Vickers-Sperry, and any others of this type will be labeled by the end of the first refueling outage to warn technicians of the trip potential if the cover is removed.
- 2) Procedures ON1431.18, "Weekly Mechanical Overspeed Trip Test" and ON1431.17, "Weekly Turbine Generator Backup Overspeed Trip Test" have been revised to exercise these valves on a weekly basis to prevent corrosion product buildup and to provide additional guidance when an unsuccessful test is indicated.
- 3) The three solenoid valves in the Emergency Trip System (oil reset, oil trip, mechanical trip solenoid valves) will be replaced following performance of the oil system flush during the first refueling outage
- 4) An evaluation was performed of previous problems with the condenser steam dump valves and it was determined that no generic problem

exists.

Plant Conditions

At the time of this event, the plant was in Mode 1, Power Operation at 100%, with an RCS temperature of 587 degrees Fahrenheit and pressure of 2,235 psig.

This is the first event of this type at Seabrook Station.

ATTACHMENT 1 TO 9107050002 PAGE 1 OF 2

New Hampshire Ted C. Feigenbaum
Yankee President and
Chief Executive Officer

NYN- 91104

July 2, 1991

United States Nuclear Regulatory Commission
Washington, D.C. 20555

Attention: Document Control Desk

Reference: Facility Operating License No. NPF-86, Docket No. 50-443

Subject: Licensee Event Report (LER) No. 91-006-00: Reactor Trip
Due to an Inadvertent Actuation of the Turbine Mechanical
Overspeed Protection System

Gentlemen:

Enclosed please find Licensee Event Report (LER) No. 91-006-00 for Seabrook Station. This submittal documents an event which occurred on June 2, 1991, and is being reported pursuant to 10CFR50.73(a)(2)(iv).

Should you require further information regarding this matter, please contact Mr. Allen L. Legendre, Lead Engineer - Compliance, at (603) 474-9521, extension 2373.

Very truly yours,

Ted C. Feigenbaum

TCF:WJT/act

Enclosures: NRC Forms 366, 366A

New Hampshire Yankee Division of Public Service Company of New Hampshire
P.O. Box 300 o Seabrook, NH 03874 o Telephone (603) 474-9521

ATTACHMENT 1 TO 9107050002 PAGE 2 OF 2

United States Nuclear Regulatory Commission July 2, 1991
Attention: Document Control Desk Page two

cc: Mr. Thomas T. Martin
Regional Administrator
United States Nuclear Regulatory Commission
Region I
475 Allendale Road
King of Prussia, PA 19406

Mr. Gordon E. Edison, Sr. Project Manager
Project Directorate 1-3
Division of Reactor Projects
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Mr. Noel Dudley
NRC Senior Resident Inspector
P.O. Box 1149
Seabrook, NH 03874

INPO
Records Center
1100 Circle 75 Parkway
Atlanta, GA 30339

*** END OF DOCUMENT ***
